

### REMARKS

The Examiner is thanked for the performance of a thorough search.

### STATUS OF CLAIMS

Claims 1, 6, 10, 14, 16, 23, 28, 32, 36, 38, 45, 50, 54, 58, 60, and 67-69 have been amended.

No claims have been cancelled, added, or withdrawn.

Claims 1-69 are currently pending in the application.

### STATUS OF DRAWINGS

On the Office Action Summary form in the Office Action, under the heading "Application Papers," item 10 refers to whether or not the drawings are accepted or objected to by the Examiner. However, neither box is checked. The Applicant respectfully requests that the status of the drawings as filed with the application on January 22, 2002 be indicated in the next communication from the Office.

### INTERVIEW SUMMARY

The Applicant thanks the Examiner for the Interview conducted on August 12, 2005. The interview was between Examiner Khai Tran and the applicant's attorney, Craig G. Holmes. The double patenting rejection, the rejection of pending Claims 67-68 as being single step method claims, and the rejection of pending Claim 1 in the Office Action were discussed along with U.S. Patent No. 6,388,513 issued to *Wright* and U.S. Patent No. 6,788,752 issued to *Andre*.

In particular, the Applicant stated that a terminal disclaimer would be filed to traverse the double patenting rejection. Regarding Claims 67 and 68, the Applicant explained that the case cited in the Office Action, *Ex parte Erlich*, did not support the position that a method claim must have more than one step, but the Examiner explained that Claims 67 and 68 were acceptable as is, regardless of *Ex parte Erlich*, because of the additional detail within Claims

67 and 68, such as how the "one or more coefficients...are selected...." Therefore, agreement was reached that Claims 67 and 68 are allowable without making any amendments to Claims 67 and 68, although the Examiner and the Applicant failed to agree on whether *Ex parte Erlich* requires that a method claim have at least two steps.

Regarding Claim 1, the Applicant discussed the proposed amendments, including that each step is performed "at a receiver" and that the noise is "includes noise from a source that is external to the receiver. The Applicant explained that the disclosure of *Wright* was directed to a predistortion technique for compensating for the non-linearity of an amplifier within a transmitter, whereas the proposed amendments to Claim 1 were directed to the steps being performed at a receiver. The Applicant also explained that proposed amendment to Claim 1 clarified that the noise is "from a source that is external to the receiver," such as "crosstalk, amplitude-modulated signals, and white Gaussian noise" that are included in Claim 10, which the Office Action indicates is allowable subject matter.

The Examiner stated that another search would need to be performed based on the amendments to Claim 1, and therefore, no agreement was reached as to the allowability of Claim 1 based on the proposed amendments. The Applicant is providing herein the amendment that was proposed during the interview, along with similar amendments to the other independent claims that were rejected in the Office Action.

#### SUMMARY OF THE REJECTIONS/OBJECTIONS

Claims 67 and 68 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite. Claims 1, 8, 14, 24-28, 30, 35, 36, 45, 49, 50, 59, and 67-69 have been provisionally rejected under the judicially-created doctrine of obviousness-type double patenting over Claims 2, 5, 11, 14, 16, 17, 22, 23, 26-29, and 37-41 of pending application No. 09/754,007. Claims 1-9, 11-16, 23-31, 33-38, 45-53, 55-50, and 67-69 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent Number 6,388,513 issued to Wright et al. (" *Wright* ") in view of U.S. Patent Number 6,788,752 issued to Andre (" *Andre* "). Claims 10, 32, and 54 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 17-22, 39-44, and 61-66 have been allowed. The rejections and objections are respectfully traversed.

## RESPONSE TO REJECTIONS NOT BASED ON THE PRIOR ART

### A. INDEFINITE REJECTIONS OF CLAIMS 67 AND 68

Claims 67 and 68 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action states:

“Claims 67-68 are narrative in form and do not contain positively recited **steps** of a specific process. Note that method claims should be set forth as **a series of steps** in the active tense in an instruction-like manner thereby recited an actual method. The claim only recites a **single step** without any additional **steps delimiting** how its use is actually practiced. Dependent claims (if applicable) should further limit base claims by reciting additional method steps in a likewise fashion. *Ex parte Erlich* 3USPQ2d 1011 at 1017.” (Emphasis in original.)

In reviewing the cited opinion of the Board of Patent Appeals and Interferences, it appears that the Office Action is incorrectly relying upon the sustained rejection of a “use” claim from *Ex parte Erlich* to support the position that a method claim must have more than one step. For the reasons explained herein, the Applicant’s respectfully submits that not only does *Ex parte Erlich* not require that a method claim include more than one step, but *Ex parte Erlich* expressly supports that a single step method claim is proper, which is also consistent with 37 CFR 1.75(i) that also supports the appropriateness of a single step method claim.

MPEP §2173.05(q) addresses “attempts to claim a process without setting for any steps, thereby resulting in an issue of indefiniteness under 35 U.S.C. 112, second paragraph.” As an example of a “use” claim, that section of the MPEP provides Claim 6 of *Ex parte Erlich*, explaining: “a claim which read: ‘A process for using monoclonal antibodies of Claim 4 to isolate and purify human fibroblast interferon.’” was held to be indefinite because it merely recites a use without any active, positive steps delimiting how this use is actually practiced. *Ex parte Erlich*, 3 USPQ2d 1011 (Bd. Pat. App. & Inter. 1986).” (Emphasis added.)

Claims 67 and 68 of the application are not “use” claims because neither recites a “use” or the “using” of something to achieve a result. For example, Claim 67 clearly recites the active, positive step of “the computer-implemented step of generating coefficient data...” and Claim 68 recites “coefficient data...” Therefore, the Applicant respectfully submits that

neither *Ex parte Erlich* nor MPEP §2173.05(q) are applicable to Claims 67 and 68 because neither of Claims 67 and 68 are “use” claims.

Furthermore, neither *Ex parte Erlich* or any other authority that the Applicant is aware of supports the contention of the Office Action that a method claim must include at least two steps or that a single step method claim is indefinite. The Office Action’s citation to *Ex parte Erlich* actually states ***exactly the opposite***. Specifically, the Board in *Ex parte Erlich* explains in relevant part: “While we agree with appellants that the claims need not recite all of the operating details, we do find that a method claim should at least recite a positive, active step(s) so that the claim will ‘set out and circumscribe a particular area with a reasonable degree of precision and particularity...’” (*Ex parte Erlich*, at 1017; citations omitted; emphasis added.) By referring to “a positive, active step(s),” the Board is expressly stating that a single step method claim is proper and consistent with the Board’s rationale in rejecting the “use” claim at issue in that case. Otherwise the board would not have used the singular “a”, nor would the Board indicate that there could be either one step or more than one step by using the terminology “step(s)”. Therefore, the Applicant respectfully submits that *Ex parte Erlich* does not support the proposition that a single step method claim is indefinite.

Claim 67 expressly recites a positive, active step, namely “generating coefficient data...,” and thereafter recites features of how the coefficients are selected based on noise power and impulse response and the use of the coefficients to equalize received data. Therefore, the Applicant respectfully submits that Claim 67 is fully consistent with the decision of the Board in *Ex parte Erlich* to the extent that the Board required therein “a positive, active step.” Furthermore, as with Claim 67, Claim 68 includes similar features relating to the expressly recited “coefficient data,” and therefore the Applicant respectfully submits that *Ex parte Erlich* fails to support the rejection of Claim 68 for indefiniteness.

In addition, as discussed in MPEP §608.01(m) regarding the form of claims, 37 CFR 1.75(i) states: “***Where*** a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation.” (Emphasis added.) This rule is conditional, meaning that it applies only to a claim on the condition that the claim has multiple elements or steps. If a method claim were required to include at least two steps, the conditional of Rule 75(i) would be meaningless, which would be inconsistent with the

basic canons of interpretation against making an interpretation that renders a rule irrelevant and meaningless. Therefore, the use of a conditional phrase in Rule 75(i) expressly allows for the possibility that claims may only have a single step or a single element.

The Office Action's rejection of Claims 67 and 68 being in "narrative form" is also inconsistent with Rule 75(i). Because Rule 75(i) expressly allows for claims with only a single element or a single step, the guidance of Rule 75(i) to separate multiple elements or multiple steps with a line indentation is inapplicable to claims with only a single element or a single step. Thus, there is no need for line indentations in Claims 67 and 68 because the purpose of the line indentations is to make the separate elements or steps clear, and in a single step or single element claim, there is nothing to be separated by such line indentations. Therefore, the Applicant respectfully submits that the Office Action's basis for rejecting Claims 67 and 68 as being in narrative form is improper because there is no authority supporting such a basis for rejection and because such a basis for rejection is inconsistent with 37 CFR 1.75(i).

Finally, while the Applicant is aware that a single means claim is generally objectionable (see MPEP §2164.08(a) and 2181(V)), neither of Claims 67 and 68 are single means claims, and the Applicant is unaware of other authority that supports the proposition that a single step method claim is improper.

Therefore, the Applicant respectfully submits that there is no authority to support the Office Action's rejections of Claims 67 and 68 for being in "narrative form" and for not reciting "a series of steps." The cited authority, *Ex parte Erlich*, states exactly the opposite, and this is consistent with 37 CFR 1.75(i). As a result, the Applicant respectfully submits that the rejections of Claims 67 and 68 under 35 USC 112, second paragraph, are moot.

#### B. DOUBLE PATENTING REJECTION OVER CO-PENDING APPLICATION

The Office Action provisionally rejected Claims 1, 8, 14, 24-28, 30, 35, 36, 45, 49, 50, 59, and 67-69 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over Claims 2, 5, 11, 14, 16, 17, 22, 23, 26-29, and 37-41 of pending application S/N 09/754,007, filed on January 2, 2001.

The Applicant disagrees with the rejection and believes that the pending claims are clearly patentably distinct from the claims of Application 09/754,007. In particular, the

claims of the present Application are directed to equalizing based on “noise power of the noise from a source...that is external to the receiver,” which is different than the claims of the co-pending application that are directed to the equalizer accounting “for a frequency domain response of the equalizer and to reduce the distortion introduced by the communications channel.”

However, to advance prosecution in an expeditious manner, a proper Terminal Disclaimer is timely filed concurrently herewith. The Terminal Disclaimer is sufficient to overcome the double patenting rejection, as noted in the Office Action at page 2. See 37 CFR 1.130(b). In addition, the Applicant provides the following statement of common ownership per MPEP §706.02(I)(2)(II):

**The subject matter of Application 10/056,728 and Application 09/754,007 were, at the time the invention of Application 10/056,728 was made, owned by Bandspeed, Inc.**

Therefore, the Applicant respectfully submits that the terminal disclaimer included herein and the statement of common ownership above traverse the double patenting rejection of Claims 1, 8, 14, 24-28, 30, 35, 36, 45, 49, 50, 59, and 67-69.

In light of the traverse of the double patenting rejection of Claims 1, 8, 14, 24-28, 30, 35, 36, 45, 49, 50, 59, and 67-69, the Applicant respectfully submits that the provisional double patenting rejection of Claims 1, 8, 14, 24-28, 30, 35, 36, 45, 49, 50, 59, and 67-69 has been rendered moot.

#### RESPONSE TO REJECTIONS BASED ON THE PRIOR ART

Claims 1-9, 11-16, 23-31, 33-38, 45-53, 55-59, and 67-69 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over *Wright* in view of *Andre*. The rejections are respectfully traversed.

A. CLAIM 1

(1) INTRODUCTION TO CLAIM 1

As amended above, Claim 1 features:

“A method for processing data received from a communications channel comprising the computer-implemented steps of:

at a receiver, receiving, from the communications channel, received data that is based upon both modulated data and noise that includes noise from a source that is external to the receiver, wherein the modulated data is the result of original data modulated onto one or more carriers;

at the receiver, equalizing the received data to generate equalized data, wherein the equalizing is performed using an algorithm with a set of one or more coefficients selected based on noise power and an impulse response of the communications channel; and

at the receiver, recovering an estimate of the original data by demodulating the equalized data.” (emphasis added).

The changes to Claim 1 are fully supported by the Application, and no new matter is added. For example, in the embodiment depicted in FIG. 2, receiver 200 includes equalizer 210 that further includes FIR filter 212 and FIR coefficient estimator 214. FIG. 4 describes an embodiment of FIR filter coefficient estimation that can be implemented as part of FIR coefficient estimator 214. Furthermore, the Application defines the term “noise” as including “all sources of noise, including...external sources of interference, such as AM radio signals and crosstalk...and white Gaussian noise.” Note that Claim 1 and the other claims of the application are not limited to these particular embodiments or even to other embodiments described elsewhere in the application.

(2) INTRODUCTORY DISCUSSION OF *WRIGHT* AND *ANDRE*

In contrast to the approach of Claim 1, *Wright* discloses an approach for amplifier measurement and modeling for use in generating predistortion parameters to compensate for a nonlinear amplifier’s frequency and time dependent AM-AM and AM-PM distortion

characteristics. (Abstract.) *Wright's* approach uses a data structure with FIR filter coefficients to predistort the input transmission signal (Abstract) "in a manner that is equal to and opposite of the distortion introduced during amplification, so that the amplified signal appears undistorted." (Col. 1, lines 65-67.) As illustrated in Figures 1-3 of *Wright*, the data structure and predistortion FIR filter are implemented as part of the *transmitter* that transmits a signal, not in a *receiver* that receives the transmitted signal from the transmitter.

Also in contrast to the approach of Claim 1, *Andre* discloses an approach for compensating for intersymbol interference (ISI) in a multicarrier transmission system by generating an estimate of an ISI tail and then subtracting that estimate from the received signal. (Abstract.) *Andre* uses a transfer function that approximates the inverse of the channel transfer function to filter transmitted symbols at the receiver, based on generating a difference symbol between estimates of two consecutively transmitted symbols. (Abstract.) In particular, Figure 1 of *Andre* illustrates that tail estimation circuitry 24 is used to estimate the tail, which is then subtracted from the corresponding symbol via adder 24. (Col. 5, lines 20-27.) Note that as illustrated in Figure 1 and described in the associated description, the time domain equalizer circuitry is not involved in the tail estimation and subtraction approach, and in fact, the time domain equalizer circuitry is merely optional and therefore is not even illustrated in Figure 4. (Col. 5, lines 11-19.)

### (3) THE OFFICE ACTION'S CITATIONS FROM *WRIGHT*

The Office Action states that *Wright* discloses "in Figures 15 and 16...receiving, from the communications channel, received data that is based upon both modulated data and noise, wherein the modulated data is the result of original data modulated onto one or more carriers (a bulk delay, gain and phase state "74") followed by an FIR "76" which incorporates the frequency domain variations of these parameters...col. 27, lines 40-55."

However, Figures 15 and 16 of *Wright* merely describe the two simplest wideband models of the power amplifier 64, which are part of the amplifier system 50 of Figure 1. (Col. 27, lines 40-45, Col. 28, lines 10-11, Col. 7, lines 36-39.) The power amplifiers that are the focus of *Wright* "are widely used to *transmit* signals in communications systems," and thus are included in transmitters and not in receivers. (Col. 1, lines 21-22; emphasis added).



Furthermore, the description of Figure 15 in Column 27 of *Wright* describes that Figure 15 is the “simplest wideband model of the power amplifier 64” and that the “model consists of a bulk delay, gain and phase stage 74 followed by an FIR filter 76 which incorporate the frequency domain variations of these parameters.” (Col. 27, lines 40-45.) The cited paragraph then describes that these parameters are stored in a data structure 78 that is indexed by input power or signal amplitude because these parameters vary by input amplitude due to the nonlinearity of the amplifier. (Col. 27, lines 45-49.) Then the cited paragraph explains that a piecewise linear approximation of the amplifier’s AM-AM and AM-PM characteristic can be used and that the frequency domain variations of this characteristic is represented by the FIR coefficients. (Col. 27, lines 49-53.) Finally, the cited paragraph describes that the input signal  $V_m(t)$  is quantized into discrete levels and used to select a particular set of parameters within the data structure. (Col. 27, lines 53-55.)

Thus, nothing in the cited paragraph from *Wright* describes that the noise “includes noise from a source that is external to the receiver” as in Claim 1. Furthermore, in Claim 1, the step of “receiving, from the communications channel, received data...,” along with the other two steps of Claim 1, occur “at a receiver.” Yet the cited paragraph from *Wright* concerns only the nonlinearity of the amplifier, which as discussed above, is included in a transmitter, not a receiver.

Thus, the Applicant respectfully submits that because power amplifier of *Wright* is included in a transmitter whereas the steps of Claim 1 are performed “at a receiver,” and also because *Wright* fails to disclose that the “received data that is based upon...noise from a source that is external to the receiver,” that Claim 1 is allowable over the prior art of record.

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(4)     COMBINING THE TEACHINGS OF *WRIGHT* AND *ANDRE*

In addition, the Office Action states that it “would have been obvious to one having ordinary skill in the art at the time the invention was made to recover the original data from the transmitted data as taught by Andre into the teachings of Wright et al in order to retrieve a desired data.” However, *Andre* is directed to compensating for ISI by generating an estimate of an ISI tail and subtracting the estimate from the *received signal*, (*Andre*, Abstract, emphasis added) whereas *Wright* is directed to compensating for nonlinear amplifier frequency and time dependent AM-AM and AM-PM distortion by using a data structure to

store FIR filter coefficients to compensate for the amplifier's non-linearity in an *input transmission signal*. (*Wright*, Abstract).

The Applicants respectfully disagree that it would have been obvious to combine *Wright* and *Andre* "in order to retrieve a desired data" because *Wright* is concerned with an input transmission signal that is sent from a transmitter while *Andre* is concerned with a received signal at a receiver. The only similarity between *Wright* and *Andre* is that both are attempting to correct for changes in a signal, but the two references are fundamentally different in that each addresses a completely different and separate problem at either the start of a transmission (e.g., *Wright*) or at the end of a transmission (*Andre*).

Specifically, in *Wright*, there is no ISI, and therefore no need to compensate for ISI, in the input transmission signal since the signal has not yet been transmitted. Thus, incorporating the approach of *Andre* into *Wright* provides no benefit as the problem of ISI interference addressed by *Andre* is absent from the amplifier predistortion approach of *Wright*. Conversely, *Andre* does not include an amplifier at the receiver, and thus incorporating the amplifier predistortion approach within a transmitter of *Wright* provides no benefit for the ISI compensation approach at a receiver of *Andre*.

Thus, the only motivation provided in the Office Action is the hindsight observation that by combining features of those references, one may achieve the benefits achieved from the invention as described and claimed in the application. It is respectfully submitted that such a hindsight observation is not consistent with the Federal Circuit's requirement for "particular factual findings regarding the locus of the suggestion, teaching, or motivation to combine prior art references." See *In re Dembiczak*, 50 USPQ.2d 1617 (Fed. Cir. 1999), (citing *Gore v. Garlock*, 220 USPQ 303, 313 (Fed. Cir. 1983), explaining that "it is very easy to fall victim to the insidious effect of the hindsight syndrome where that which only the inventor taught is used against its teacher."

(5) CONCLUSION OF DISCUSSION OF CLAIM 1 AND *WRIGHT* AND *ANDRE*

Because *Wright* and *Andre*, either alone or in combination, fail to disclose, teach, suggest, or in any way render obvious performing the steps of Claim 1 "at a receiver" or that the "received data that is based upon...noise from a source that is external to the receiver," the

Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

Furthermore, because *Wright* is directed to pre-distorting an input transmission signal to an amplifier at a transmitter while *Andre* is directed to compensating for ISI in received data at a receiver, the Applicant respectfully submits that there is no motivation, teaching, or suggestion to combine disclosures of *Wright* and *Andre*.

#### B. CLAIMS 23, 45, AND 67-69

Claims 23, 45, and 67-69 contain features that are either the same as or similar to those described above with respect to Claim 1. For example, Claim 23 features performing the three steps “at a receiver” and that the “received data that is based upon...noise from a source that is external to the receiver,” both of which is the same as in Claim 1. Also, Claim 45 is amended to recite that Claim 45 is directed to a “receiver” instead of an apparatus, which is similar to Claim 1, and that the “received data that is based upon...noise from a source that is external to the receiver,” which is the same as in Claim 1.

Also, Claim 67 features “generating coefficient data” “at a receiver,” which is similar to Claim 1, and that the “received data that is based upon...noise from a source that is external to the receiver,” which is that same as in to Claim 1. Similarly, Claim 68 features “coefficient data to be used by a receiver,” which is similar to Claim 1, and that the “received data that is based upon...noise from a source that is external to the receiver,” which is the same as in Claim 1. Likewise, Claim 69 features “a coefficient generator that is within a receiver,” which is similar to Claim 1, and that the “received data that is based upon...noise from a source that is external to the receiver,” which is the same as in Claim 1.

Therefore, based on at least the reasons stated above with respect to Claim 1, the Applicant respectfully submits that Claims 23, 45, and 67-69 are allowable over the art of record and are in condition for allowance.

#### C. CLAIMS 2-9, 11-16, 24-31, 33-38, 46-53, AND 55-60

Claims 2-9 and 11-16 are dependent upon Claim 1, Claims 24-31 and 33-38 are dependent upon Claim 23, and Claims 46-53 and 55-60 are dependent upon Claim 45, and thus include each and every feature of the corresponding independent claims. Each of

Claims 2-9, 11-16, 24-31, 33-38, 46-53, and 55-60 is therefore allowable for the reasons given above for Claims 1, 23, and 45. In addition, each of Claims 2-9, 11-16, 24-31, 33-38, 46-53, and 55-60 introduces one or more additional limitations that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those limitations is not included at this time. Therefore, it is respectfully submitted that Claims 2-9, 11-16, 24-31, 33-38, 46-53, and 55-60 are allowable for the reasons given above with respect to Claims 1, 23, and 45.

D. CLAIMS 10, 32, AND 54

Claims 10, 32, and 54 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 10, 32, and 54 depend on independent Claims 1, 23, and 45, the rejections of which the Applicant respectfully submits are traversed. Because the Applicant respectfully submits that Claims 1, 23, and 45 are allowable for the reasons stated above, the Applicant respectfully submits that the objections to Claims 10, 32, and 54 are moot in light of the traversal of the rejections of Claims 1, 23, and 45.

CONCLUSION

The Office Action acknowledges that Claims 17-22, 39-44, and 61-66 are directed to allowable subject matter.

The Applicant believes that all issues raised in the Office Action have been addressed and that allowance of the pending claims is appropriate. After entry of the amendments, further examination on the merits is respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

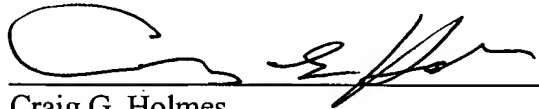
To the extent necessary to make this reply timely filed, the Applicant petitions for an extension of time under 37 C.F.R. § 1.136.

If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP

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on 8/24/05 by Trudy Bagdon